

SYNOPSIS OF PLUMBAGINACEAE IN TURKEY

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ABSTRACT. A synopsis of the *Plumbaginaceae* in Turkey and the E Aegean islands is given. There are keys to the genera and species and a general indication of their distribution in Turkey.

INTRODUCTION

Boissier's account in his *Flora Orientalis* vol. 4 (1879) has remained the most comprehensive treatment of this family in Turkey. Since that time so much new material has accumulated that Boissier's account is often inadequate to deal with it. K. H. Rechinger's *Flora Aegaea* (1943) covers the *Limonium* species present in the East Aegean Islands (included in Davis's *Flora of Turkey*), and S. Mobayen's *Revision Taxonomique du genre Acantholimon* (Tehran, 1964) deals with the latter genus in Anatolia. Nevertheless, a more up-to-date treatment has remained a *desideratum*. The *Plumbaginaceae* are represented by six genera in Turkey and the E Aegean Islands. In this area the larger genera *Acantholimon* and *Limonium* are considered by the author to have 27 and 15 species respectively; *Limoniopsis* and *Armeria* each have two species; there is one species of *Plumbago* and one of *Gonio-limon*.

The present account of the family has been condensed from the author's revision for the *Flora of Turkey* vol. 6, and formed part of the work done for a Ph.D. at the University of Edinburgh. By publishing an abridged version now, it is hoped to stimulate further research on the group, involving the revision of collections not seen by the author, and the making of new collections (particularly of *Acantholimon*) that may lead to a more complete account for the Flora in a few years time. In this synopsis, citation of specimens (except for types) has had to be deferred to the relevant volume of the Flora. The author's determinations, however, will be found on the collections at Edinburgh and Kew, and specimen citations are included in the thesis.

The revision has been primarily based on the collections in the herbaria of the Royal Botanic Garden, Edinburgh, the Royal Botanic Gardens, Kew, and the British Museum (Natural History) in London. In addition, valuable material has been borrowed and studied from Dr A. Huber-Morath, Basel, the Conservatoire et Jardin Botanique, Genève (including the Aznavour—B.V.D. Post herbarium) and the Naturhistorisches Museum, Wien.

KEY TO GENERA IN TURKEY AND THE AEGEAN ISLANDS

1. Calyx herbaceous, glandular; corolla gamopetalous, hypocrateriform; styles united to the top (Tribus *Plumbagineae*)
 I. *Plumbago* (p. 58)

+ Calyx scarious, non-glandular; corolla polypetalous or slightly gamopetalous; styles free, sometimes connate at the base (Tribus *Staticeae* Reich.).

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2.	Stigma cylindrical, filiform	3
+	Stigma capitate to sub-oblong-capitate	4
3.	Inflorescence a terminal spicate-head on simple, scaleless scapes; styles hairy below	6. <i>Armeria</i> (p. 77)
+	Inflorescence not as above; styles glabrous throughout	2. <i>Limonium</i> (p. 58)
4.	Leaves neither fleshy nor pungent; second inner bract with 3 long recurved cusps; styles shaggy	3. <i>Goniolimon</i> (p. 64)
+	Leaves either \pm fleshy or pungent; second inner bract not as above; styles glabrous	5
5.	Leaves \pm fleshy, obovate to oblong-spathulate, non-pungent; scape branches tetragonal	4. <i>Limoniopsis</i> (p. 64)
+	Leaves rigid, linear-triquetrous to linear-lanceolate, pungent; scapes terete	5. <i>Acantholimon</i> (p. 65)

1. PLUMBAGO L., Sp. Pl. 151 (1753).

Herbaceous perennial, subshrubs or shrubs. Inflorescence of terminal \pm capitate spikes. Calyx tubular, with 5 herbaceous ribs densely studded with large stalked glands, 5-toothed at the top. Corolla gamopetalous; the narrow tube generally exceeding the calyx; limb rotate, 5-lobed. Stamens free; filaments linear, concave-dilated in lower part. Styles 5, united throughout their length except for fairly long stigmas; stigmas filiform, glandular on the inner side. Ovary oblong; the transition between ovary and style distinct.

This genus contains about 15 species, mostly distributed through the tropics. There is only one species in Turkey.

P. europaea L., Sp. Pl. 151 (1753).

Habitat: dry gravelly and limestone slopes, dry igneous slopes, fallow fields and waste places, 10-1900 m.

Described from Europe (Hb. Linn. 261/1).

Widespread in Turkey and offshore Islands.

2. LIMONIUM Miller, Gard. Dict. Abridg. ed. 4 (1754) *nom. conserv.* Syn.: *Statice* L., Sp. Pl. 274 (1753) *partim*.

Perennial or rarely annual herbs or subshrubs. Caudex usually short, \pm woody, branched, rarely long and strongly branched with ligneous branches. Leaves usually in basal rosettes, sometimes in fascicular rosettes on the scape branches, very rarely present in numerous dense fascicles along the ligneous branches. Spikelets aggregated into spikes of varying length and compactness, terminating the branches of the inflorescence. Calyx funnel-shaped, obconical to \pm tubular, \pm scarious, straight or oblique in the lower region; limb 5- to 10-lobed; nerves thick, usually terminating below the margin, very rarely excurrent. Corolla $1\frac{1}{2}$ \times as long as the calyx; petals distinct, slightly connate at the base. Stamens free, adnate at the base to the petals. Ovary subovoid; transition between ovary and styles distinct; styles quite free at the base; stigmas cylindrical, filiform.

The genus contains about 300 species from maritime areas and salt steppe, distributed through all parts of the world, but especially numerous in Eurasia. Many of the critical taxa present in the C & S Aegean islands are absent from the E Aegean islands, in which only 7 species are present.

SYNOPSIS OF SECTIONS IN TURKEY AND THE AEGEAN ISLANDS

1. Sect. *Pteroclados* (Boiss.) Bokhari, comb. nov.Syn.: *Statice* Sect. *Pteroclados* Boiss. in DC., Prodr. 12: 635 (1848).

Annual or perennial herbs or subshrubs. Leaves in a basal rosette, entire to sinuate-margined. Scapes broadly winged. Calyx funnel-shaped, with a broad limb; tube straight; nerves concolorous, disappearing below the margin.

L. sinuatum (L.) Mill.

2. Sect. *Limonium*Syn.: *Statice* Sect. *Limonium* Boiss. in DC., Prodr. 12: 643 (1848).

Perennial herb or suffruticose. Leaves usually in a basal rosette, entire. Scapes terete, sometimes with numerous, repeatedly forked sterile branches in the lower part. Calyx obconical or funnel-shaped with a narrow limb; limb 5-10-lobed; tube oblique to nearly straight in the lower part, usually pilose on the nerves; nerves reaching or terminating below the margin.

L. gmelinii (Willd.) O. Kuntze, *L. meyeri* (Boiss.) O. Kuntze, *L. effusum* (Boiss.) O. Kuntze, *L. ocytisifolium* (Poir.) O. Kuntze, *L. virgatum* (Willd.) Fourr., *L. graecum* (Poir.) Rech. fil., *L. sieberi* (Boiss.) O. Kuntze, *L. caspium* (Willd.) Gams, *L. iconicum* (Boiss. & Heldr.) O. Kuntze, *L. tamarioides* Bokhari.

3. Sect. *Sphaerostachys* (Boiss.) Bokhari, comb. nov.Syn.: *Statice* Sect. *Sphaerostachys* Boiss. in DC., Prodr. 12: 661 (1848).

Perennial herbs. Leaves in a basal rosette, entire. Scapes terete without sterile branches in the lower part. Calyx obconical; limb obscurely 5-lobed; tube straight, densely pilose on and between the nerves; nerves terminating well below the margin.

L. lilacinum (Boiss. & Bal.) Wagenitz, *L. globuliferum* (Boiss. & Heldr.) O. Kuntze.

4. Sect. *Sarcophyllum* (Boiss.) Lincz. in Fl. U.R.S.S. 18: 457 (1952).

Perennial subshrubs, with rather long, leafy, ligneous branches, leaves fleshy, arranged in lax or dense fascicular rosettes. Calyx obconical or narrowly funnel-shaped, with a rather narrow limb; tube nearly straight in the lower part; nerves reaching or terminating below the margin.

L. anatolicum Hedge.

5. Sect. *Schizymentum* (Boiss.) Bokhari, comb. nov.Syn.: *Statice* Sect. *Schizymentum* Boiss. in DC., Prodr. 12: 665 (1848).

Annual herbs. Leaves in a basal rosette, entire. Scapes terete without sterile branches. Calyx subtubular; limb \pm truncate but finally lacerating into 5 long spreading lobes; limb \pm straight; nerves excurrent into long, hooked barbs.

L. echiooides (L.) Miller.

KEY TO LIMONIUM SPECIES IN TURKEY

1. Leaves pinnatifid to pinnatisect; scapes broadly winged; calyx limb truncate *I. sinuatum*

+. Leaves entire; scapes \pm terete; calyx limb 5-10-lobed 2

2. Annual; calyx deeply lacerated between the lobes; nerves excurrent forming hooked barbs *15. echiodies*

+. Perennials; calyx not deeply lacerated; nerves terminating below the margin 3

3. Leaves up to 12 mm long, arranged in numerous fascicular rosettes below the scapes *14. anatolicum*

+. Leaves more than 30 mm long, in basal rosettes, rarely present on the scape branches 4

4. Scapes with numerous, repeatedly forked sterile branches in the lower part 5

+. Scapes without repeatedly forked sterile branches 10

5. Leaves dying before flowering is over; sterile branches slender, fragile; mature spikelets up to 4.5 mm long; outer bract entirely scarious 6

+. Leaves not as above; sterile branches \pm stout; mature spikelets more than 7 mm long; outer bract rusty brown, narrowly scarious-margined 8

6. Caudex with numerous overlapping brown scales; spikelets arranged in globose heads along the scape branches; calyx lobes emarginate-apiculate *11. tamaricoides*

+. Caudex scaleless; spikelets arranged in a densely imbricate spike terminating the scape branches; calyx lobes ovate, obtuse 7

7. Spikelets 4-5 mm long; second inner bract half to two-thirds herbaceous; calyx tube usually pilose on the two nerves *9. caspium*

+. Spikelets 2-3 mm long; second inner bract nearly scarious except at the base; calyx tube pilose throughout *10. iconicum*

8. Scapes and leaves tuberculate; scape branches distinctly articulated *7. graecum*

+. Scapes and leaves smooth; scape branches not articulated 9

9. Spikelets 1-2-flowered, remotely spaced; calyx suberect *8. sieberi*

+. Spikelets 3-4-flowered, congested; calyx curved *6. virgatum*

10. Leaves obovate to oblong-spathulate, 30-50 mm long, up to 13 mm broad, calyx tube appressed pilose *5. ocytifolium*

+. Leaves oblong-elliptic to oblong-obovate or elliptic-lanceolate, more than 60 mm long and more than 30 mm broad; calyx tube pilose 11

11. Leaves \pm fleshy; petiole without a foliaceous margin; vein reticulum indistinct 12

+. Leaves not fleshy; petiole with a foliaceous margin; vein reticulum distinct 13

12. Scapes branching usually above the middle; spikelets 2-2.5 mm long, arranged in small, densely congested globose heads *13. globuliferum*

+. Scapes branching below the middle sometimes nearly from the base; spikelets 4-5 mm long; congested in subscorpioid spikes *12. lilacinum*

13. Spikelets 1-(2)-flowered; leaf midrib produced into a 1-2 mm setaceous mucro 4. *effusum*
 + Spikelets 2-3-flowered; leaf midrib not produced into a setaceous mucro 14
 14. Spikelets remotely spaced; spikes fairly lax; inflorescence branches loosely paniculate, spreading 3. *meyeri*
 + Spikelets congested; spikes compact; inflorescence branches rather contracted 2. *gmelinii*

1. *L. sinuatum* (L.) Miller, Gard. Dict. ed. 8 (1768).

Syn.: *Statice sinuata* L., Sp. Pl. 276 (1753).

Habitat: coastal limestone cliffs, sandy shore and pasture land, extending up to 100 m.

Described from Italy, S. Spain and Greece (Hb. Linn. 395/33).

West & South-West Anatolia, Islands.

2. *L. gmelinii* (Willd.) O. Kuntze, Rev. Gen. 2: 395 (1891).

Habitat: saline places on the coast and inland, 0-1450 m.

i. Leaves oblong-obovate; scapes branching usually below the middle; calyx lobes rounded-triangular var. *gmelinii*
 + Leaves elliptic-lanceolate; scapes branching in the upper half; calyx lobes triangular var. *lancifolium*

var. *gmelinii*

Syn.: *Statice gmelinii* Willd., Sp. Pl. 1: 1524 (1797).

S. gmelinii var. *genuina* Boiss. in DC., Prodr. 12: 645 (1848).

S. pycnantha C. Koch in Linnaea 21: 716 (1848).

S. gmelinii var. *typica* Trautv. in Bull. Acad. Sc. Petersb. 14: 252 (1856).

Limonium pycnanthum (C. Koch) O. Kuntze, Rev. Gen. 2: 395 (1891).

Statice gmelinii & *scoparia* Schmalh., Fl. Sred. Juz. Ross. 2: 191 (1897).

Described from Siberia (Hb. Willd., B).

North & West Turkey and Inner Anatolia.

var. *lancifolium* Bokhari in Notes R.B.G. Edinb. 30: 301 (1970).

Type: [Turkey Al (E) Tekirdağ] Marmaraereglisi, 45 km from Tekirdağ, near sea-level; salty flats, *Davis & Coode*, D. 39189 (holo. E).

West Turkey, Central Anatolia.

3. *L. meyeri* (Boiss.) O. Kuntze, Rev. Gen. 2: 395 (1891).

Syn.: *Statice meyeri* Boiss. in DC., Prodr. 12: 645 (1848).

S. gmelinii var. *laxiflora* Boiss. in DC., Prodr. 12: 646 (1848).

S. obovata Ledeb., Fl. Ross. 3: 468 (1849).

Habitat: salt flats inland, 800 m.

Syntypes: In Tauria (Crimea), Herb. Fauche (G), *Fischer*, *C. A. Meyer* (LE). North-East Anatolia.

4. *L. effusum* (Boiss.) O. Kuntze, Rev. Gen. 2: 395 (1891).

Syn.: *Statice effusa* Boiss. in DC., Prodr. 12: 646 (1846).

Type: [Turkey C2 Denizli] in Lydia interiori prope Hierapolim, *Mitchell* in *Hook.* (K).

West Anatolia.

5. *L. ocyminifolium* (Poiret) O. Kuntze, Rev. Gen. 2: 396 (1891).
 Syn.: *Statice ocyminifolia* Poiret, Encycl. Méthod. Suppl. 5: 238 (1817).
 Habitat: sea shores.
 Described from East Mediterranean (Levant), *Hb. Desfontaines* (P.).
 East Aegean Islands.

6. *L. virgatum* (Willd.) Fourr. in Ann. Soc. Linn. Lyon 17: 141 (1869).
 Syn.: *Statice virgata* Willd., Enum. Pl. Hort. Berol. 336 (1809).
S. smithii Tenore, Fl. Nap. 3: 350 (1829).
 Habitat: sea shores, maritime rocks.
 Described from Europe.
 North-West Turkey, South-West Anatolia, Islands.

7. *L. graecum* (Poiret) Rech. fil. in Denkschr. Akad. Wiss. Wien, Math.-Nat. 105, 1: 427 (1943) in adnot.
 Habitat: sea shores.
 I. Leaves oblong-spathulate, entire var. *graecum*
 + Leaves lanceolate-spathulate, ± denticulate var. *hyssopifolium*

var. *graecum*

Syn.: *Statice graeca* Poiret, Encycl. Method. Suppl. 5: 237 (1817).
S. rorida Sibth. & Smith., Fl. Gr. 3: 91 (1819).
S. prolifera D'Urv., Enum. Pl. 35: (1822).
Statice rorida var. *prolifera* (D'Urv.) Boiss., Fl. Or. 4: 862 (1879).
 Described from Greece, *Hb. Desfontaines* (P.).
 East Aegean Islands.

var. *hyssopifolium* (Girard) Bokhari, comb. nov.

Syn.: *Statice hyssopifolia* Girard in Ann. Sci. Nat. Sér. 3, 2: 239 (1844).
S. graeca var. *hyssopifolia* (Girard) Boiss. in DC., Prodr. 12: 650 (1848).
Statice rorida var. *hyssopifolia* (Girard) Boiss., Fl. Or. 4: 862 (1874).
Limonium hyssopifolium (Girard) Rech. fil. in Denkschr. Akad. Wiss. Wien, Math.-Nat. 105, 1: 427 (1943) in adnot.
 Syntypes: In insula Helena, *Tourn. Hb.* (P); in Insula Tragonisi in *Hb. Juss.*; in Crete, *Olivier & Bruguière* (P).
 East Aegean Islands.

8. *L. sieberi* (Boiss.) O. Kuntze, Rev. Gen. 2: 396 (1891).

Syn.: *Statice sieberi* Boiss., Voy. Espagne 2: 530 (1841), in nota.
S. graeca var. *sieberi* (Boiss.) Boiss. in DC., Prodr. 12: 650 (1848).
S. smithii Gandoger, Fl. Cretica 10: 88 (1916).

Habitat: sea shores.

Syntypes: in littoribus Atticae, *Spruner*; Cretae, *Sieber* (K); insula Leros, *Olivier* in DC. Herb. (G).
 West and South-West Anatolia, Islands.

**9. *L. caspium* (Willd.) Gams in Hegi, Ill. Fl. Mittel. Europ. 5, 3: 1880 (1927).
Syn.: *Statice caspia* Willd., Enum. Hort. Berol. 1: 336 (1809).**

Statice Limonium L. var. *bellidifolium* Gouan, Fl. Monsp. 231 (1756).
S. reticulata auct.; M. Bieb., Fl. Taur.-Cauc. 1: 250 (1808) non Linn.
Limonium bellidifolium (Gouan) Dum., Fl. Belg. 1: 27 (1827).

Habitat: saline places on the coast and inland, 0-1000 m.

Described from the northern part of the Caspian area (B).

West Turkey and central Anatolia.

10. *L. iconicum* (Boiss. & Heldr.) O. Kuntze, Rev. Gen. 2: 395 (1891).

Syn.: *Statice iconica* Boiss. & Heldr. in DC., Prodr. 12: 661 (1848).

Habitat: inland salt steppe, 900-1040 m.

Type: [Turkey C4 Konya] in salsis planitiei Koniah, vi 1846, Heldreich (iso. E)
Central Anatolia.

11. *L. tamaricoides* Bokhari in Notes R.B.G. Edinb. 30: 301 (1970).

Type: [Turkey B4 Niğde] Aksaray, K. Karamanoğlu (holo. E; iso. Hb. Huber-Morath).

This species is only known from the type gathering.

12. *L. lilacinum* (Boiss. & Bal.) Wagenitz in Willdenowia 3: 265 (1962).

Syn.: *Statice lilacinum* Boiss. & Bal. in Boiss., Diagn. ser. 2, 4: 68 (1859).
S. gmelinii var. *lilacina* Boiss., Fl. Or. 4: 859 (1879).

Habitat: saline places inland, 910-1200 m.

Type: [Turkey B5 Kayseri] in salsis inter Indjeson (Incesu) et Caesareum, 1100 m, fl. Julio, Balansa 997 (G).

Central Anatolia.

13. *L. globuliferum* (Boiss. & Heldr.) O. Kuntze, Rev. Gen. 2: 395 (1891).

Syn.: *Statice globulifera* Boiss. & Heldr. in DC., Prodr. 12: 665 (1848).

Habitat: saline places inland, 900-1100 m.

Type: [Turkey C4 Konya] in salsis hyeme inundatis planitiei Koniah, vi 1845, Heldreich (iso. E).

Central Anatolia.

14. *L. anatolicum* Hedge in Notes R.B.G. Edinb. 23: 556 (1961).

Habitat: saline places inland.

Type: [Turkey B4 Konya] distr. Çihanbeyli, Acituz gölü near Kırkışla, 900-1000 m, saline clay flats with *Salicornia* and *Atriplex*, Davis 16631 (holo. E; iso K).

Central Anatolia; endemic.

15. *L. echiooides* (L.) Miller, Gard. Dict. ed. 8 (1768).

Syn.: *Statice echiooides* L., Sp. Pl. 275 (1753).

S. aristata Sibth. & Smith, Fl. Gr. Prodr. 1: 213 (1806).

Habitat: dry sandy places near the sea shore.

Described from Montpellier, France. (Hb. Linn. 395/101).

West and South Anatolia, Islands.

3. GONIOLIMON Boiss. in DC., Prodr. 12: 632 (1848).Syn.: *Statice* Sect. *Tropidice* Griseb., Spicil. Fl. Rumel. 2: 299 (1845).

Perennial plants with short ± woody caudex. Leaves in basal rosettes. Spikes fairly loose or dense, borne on terminal, usually more or less angled or winged, branches of compoundly panicled or sometimes subcorymbose scapes. Calyx broadly or narrowly funnel-shaped. Limb fairly broad, ± distinctly 5 or 10 lobed. Petals nearly distinct except at the base where annularly connate. Stamens free; filaments of stamens distinctly dilated in lower part and slightly adnate to petals. Styles distinct from base, shaggy in lower part with rather long hairs. Stigmas subspherically depressed-capitate. Ovary ovoid or oblong-ovoid; transition between ovary and style distinct.

This genus is known to contain about 20 species, distributed from North Africa (Algeria) to Mongolia. There is only one species in Turkey.

G. collinum (Griseb.) Boiss. in DC., Prodr. 12: 633 (1848).Syn.: *Statice collina* Griseb., Spicil. Fl. Rumel. 2: 300 (1845).

Habitat: fallow fields in steppe, chalky hills, stream beds, 250–750 m.

Syntypes. Thrace: Tschatal-tepē, Grisebach; in Haemo, Frivaldszky; ad Hellespontum, sec. Forskahl.

Turkey in Europe, West and Central Anatolia.

4. LIMONIOPSIS Lincz in Fl. U.R.S.S. 18: 376, 744 (1952).

Perennial plants with short woody caudex. Leaves in basal rosettes, fairly thick and fleshy. Scapes slender, virgate, compoundly panicled. Spikelets 1–3-flowered, remotely spaced. Calyx subtubular; limb narrowly campanulate, 10-lobed. Corolla $1\frac{1}{2}$ × as long as the calyx; petals nearly distinct, connate at the base, becoming incurved after anthesis. Filaments of the stamen distinct in the upper part, in lower part strongly dilated, connate and adnate to the petals. Ovary narrowly fusiform, imperceptibly passing into the style; styles distinct from base; stigmas depressed-capitate.

KEY TO LIMONIOPSIS SPECIES

- 1. Spikelets 2–3-flowered; second inner bract briefly 3-cuspidate; calyx nerves excurrent 1. *owerinii*
- + Spikelets 1–(2)-flowered; second inner bract non-cuspidate; calyx nerves terminating below the margin 2. *davisi*

The genus has only two species. In Turkey they are confined to East Anatolia. *L. davisi* Bokhari is apparently endemic to SE Anatolia, an area which has also quite a few endemic species of *Acantholimon*. *L. owerinii* (Boiss.) Lincz. has a disjunct distribution; it occurs on the upper Euphrates and in the Caucasus (Daghestan).

1. *L. owerinii* (Boiss.) Lincz. in Fl. U.R.S.S. 18: 377 (1952).Syn.: *Statice owerinii* Boiss., Fl. Or. 4: 820 (1879).*Limonium owerinii* (Boiss.) O. Kuntze, Rev. Gen. 2: 396 (1891).

Habitat: mountain slopes.

Type: [Caucasus] in ditione Gumbat Caucasi Orientalis supra Tchirkal, 457 m, Owerin (LE).

Upper Euphrates.

2. *L. davisii* Bokhari in Notes R.B.G. Edinb. 30: 303 (1970).
 Type: [Turkey B9 Van] distr. Gevaş: Artos Dağ, gorge, in limestone crevices, 3134 m, Davis 22704 (holo E; iso. K).

5. **ACANTHOLIMON** Boiss., Diagn., sér. 1, 7: 69 (1846) p.p.; nomen genericum conservandum proposita Lincz. in Taxon 18, 3: 340 (1969).
 Syn.: *Statice* Subgen. *Armeriastrum* Jaub. & Sp. in Ann. Sci. Nat. sér. 2, 20: 248 (1843).
Armeriastrum (Jaub. & Sp.) Lindley, Veg. Kingd. 641 (1846).

Perennial, densely or laxly pulvinate shrubs. Leaves commonly linear-triquetrous, subcylindrical, subulate, sometimes flat and fairly broad, scabrid or smooth-margined, nearly always pungent. Inflorescence a simple or branched, distichous spike, sometimes paniculate or a spicate head. Calyx funnel-shaped or tubular, 5-nerved, usually glabrous internally on the nerves rarely hairy within on the nerves. Petals slightly connate at the base. Filaments of the stamen dilated in the lower part and adnate to the petals. Styles glabrous, very rarely verrucose. Stigmas hemispherical or suboblong-capitate. Ovary linear-cylindrical, imperceptibly passing into styles, glabrous, very rarely verrucose.

This genus contains about 196 known species, mostly of restricted distribution and confined to mountainous regions (chiefly in the intermediate and higher zones). The genus has its maximum development in SW & Central Asia, but extends to the west as far as S Albania, SW Greece and Crete, and eastwards to W Tibet (Israel Journ. Bot. 19: 411, 1970).

SYNOPSIS OF SECTIONS IN TURKEY

1. Sect. *Glumaria* Boiss. in DC., Prodr. 12: 623 (1848).
 Syn.: Sect. *Speciosissima* Bornm. in Fedde Report. 41: 342 (1936-37).
Gladiolimon speciosissimum (Aitch. & Hemsl.) Mobayen, Revis. Taxon. Acanthol. 296 (1964).

Rather compactly pulvinate shrubs. Leaves \pm homomorphic. Inflorescence usually 2-ranked, lax or dense spike. Spikelets 1-4-flowered, 3-7-bracteate. Calyx narrowly funnel-shaped.

A. latifolium Boiss.

2. Sect. *Tragacanthina* Bunge in Mém. Sc. Petersb. sér. 7, 18, 2: 54 (1872).
 Loosely to densely pulvinate shrubs. Leaves heteromorphic; spring leaves lanceolate, fleshy, much shorter and broader than the summer leaves, scarious-margined and early-evanescent; summer leaves subcylindrical, \pm subulate, smooth-margined, persistent. Spikelets 1-flowered, 3-bracteate. Calyx tubular or funnel-shaped.

A. curviflorum Bunge, *A. quinquelobum* Bunge, *A. erinaceum* (Jaub. & Sp.) Lincz.

3. Sect. *Staticopsis* Boiss., Diagn. sér, 1, 7: 71 (1846).

Loosely to densely pulvinate shrubs. Leaves homomorphic. Inflorescence simple or branched, lax or congested, 2-ranked spikes, sometimes spikelets congested terminally. Spikelets always 1-flowered, 3-bracteate. Calyx funnel-shaped.

A. lepturoides (Jaub. & Sp.) Boiss., *A. spirizianum* Mobayen, *A. venustum* Boiss., *A. halophilum* Bokhari, *A. acerosum* (Willd.) Boiss., *A. caryophyllaceum* Boiss., *A. armenum* Boiss. & Huet, *A. kotschyi* (Jaub. & Sp.) Boiss., *A. confertiflorum* Bokhari, *A. dianthifolium* Bokhari, *A. libanoticum* Boiss., *A. glumaceum* (Jaub. & Sp.) Boiss., *A. caesareum* Boiss. & Bal., *A. huetii* Boiss., *A. saxifragiforme* Mobayen, *A. strigillosum* Bokhari, *A. calvertii* Boiss., *A. hypochaerum* Mobayen, *A. reflexifolium* Bokhari, *A. puberulum* Boiss., *A. damassanum* Mobayen, *A. androsaceum* (Jaub. & Sp.) Boiss.

4. Sect. *Acantholimon*

Densely or loosely pulvinate shrubs. Leaves homomorphic. Inflorescence subspherical to an oblong spicate-head. Spikelets 2-5-flowered, 4-6-bracteate. Calyx funnel-shaped.

A. bracteatum (Girard) Boiss.

KEY TO ACANTHOLIMON SPECIES IN TURKEY

1.	Spikelets 2-4-flowered, 4-6-bracteate	2
+	Spikelets always 1-flowered, 3-bracteate	3
2.	Leaves up to 2.5 mm broad; inflorescence a spicate-head; outer bract ovate-orbicular, longly aristate	27. <i>bracteatum</i>
+	Leaves more than 3.5 mm broad; inflorescence a dense spike; outer bract ovate-triangular, mucronate	1. <i>latifolium</i>
3.	Inflorescence paniculate; calyx tubular	4
+	Inflorescence a simple or 1-2 branched spike; calyx always funnel-shaped	5
4.	Calyx tube smoothly curved, nerves running through the lobes, usually slightly excurrent	2. <i>curviflorum</i>
+	Calyx tube suberect, nerves running in between the lobes; stopping below the margin	3. <i>quinquelobum</i>
5.	Calyx limb pink to dark purple	6
+	Calyx limb white to lilac	10
6.	Spikes lax, 2-ranked, not congested terminally	7. <i>venustum</i>
+	Spikes dense, distichous or imbricate, congested terminally	7
7.	Lower parts of the branches with persistent circinate leaf bases; scapes usually exceeding the leaves	21. <i>calvertii</i>
+	Lower parts of the branches without circinate leaf bases; scapes lacking	8
8.	Leaves more than 25 mm long; spikes with 8-10 spikelets, distichous; spikelets more than 14 mm long	22. <i>hypochaerum</i>
+	Leaves up to 20 mm long; spikes with 3-4 spikelets, imbricate; spikelets up to 12 mm long	9

9.	Spring leaves fleshy, deciduous; summer leaves subulate, smooth-margined	4. <i>erinaceum</i>
+	Spring leaves rigid, persistent; summer leaves plano-triquetrous, scabrid-margined	26. <i>androsaceum</i>
10.	Spikelets not congested terminally; spikes usually simple, rarely with 1-2 long branches	11
+	Spikelets congested terminally; spikes simple or with 1-2 short branches	27
11.	Spikes with 1-2 long branches	12
+	Spikes always simple, densely or laxly distichous	13
12.	Outer bract longer than the inner bracts; inner bracts broadly scarious-margined, narrowly obtuse, mucronate	5. <i>lepturoides</i>
+	Outer bract smaller than the inner bracts; inner bracts purplish, broadly obtuse, mucronulate	6. <i>spirizianum</i>
13.	Spikes densely distichous; outer bracts $2 \times$ longer than the joints	14
+	Spikes laxly distichous; outer bracts equal or $1\frac{1}{2} \times$ longer than the joints	15
14.	Leaves \pm subulate, \pm smooth-margined; outer bract longer than the inner bracts; inner bracts acute, aristulate	13. <i>confertiflorum</i>
+	Leaves linear-lanceolate, scabrid-margined, outer bract shorter than the inner bracts; inner bracts retuse, mucronulate	14. <i>dianthifolium</i>
15.	Outer bract longer than the inner bracts	16
+	Bracts subequal or outer bract distinctly shorter than the inner bracts	20
16.	Scapes, bracts and joints glabrous; fully expanded calyx limb up to 2.5 mm broad	5. <i>lepturoides</i>
+	At least joints scabrid; fully expanded calyx limb more than 3 mm broad	17
17.	Calyx limb white, nerves bright purple	18
+	Calyx limb palish white, nerves concolorous	19
18.	Leaves green; spikes more than 60 mm long; outer bract more than 10 mm long	10. <i>caryophyllaceum</i>
+	Leaves glaucous; spikes less than 50 mm long; outer bract less than 9 mm long	11. <i>armenum</i>
19.	Spring leaves 2.5-3 mm broad, strongly reflexed; scapes with one scale	11. <i>armenum</i>
+	Spring leaves up to 2 mm broad, usually spreading, rarely reflexed, if so then scapes with 2 scales	12. <i>kotschyi</i>
20.	Bracts subequal	21
+	Outer bracts distinctly shorter than the inner bracts	24
21.	Plants laxly cushioned; branches laxly leafy; at least inner bracts puberulent on the nerves	10. <i>caryophyllaceum</i>
+	Plant compactly cushioned; branches densely leafy; bracts glabrous	22
22.	Spikes up to 25 mm long; outer bract keeled; lower leaves spreading	15. <i>libanoticum</i>
+	Spikes more than 30 mm long; outer bract not keeled; lower leaves reflexed	23

23. Leaves greenish; inner bract hyaline except for the green nerves; calyx up to 12 mm long, ± truncate *II. armenum*

+ Leaves glaucous to glaucous-green, inner bracts broadly scarious-margined; calyx more than 12 mm long, usually 5-10-lobed *9. acerosum*

24. Fully expanded calyx limb up to 4 mm broad; nerves ending well below the limb margin *10. caryophyllaceum*

+ Fully expanded calyx limb more than 5 mm broad; nerves reaching the margin of the limb, usually excurrent 25

25. Scapes shorter than the leaves; spikes up to 50 mm long *12. kotschyi*

+ Scapes longer than the leaves; spikes more than 60 mm long 26

26. Strongly glaucous, densely calcareous-punctate shrub; calyx lobes triangular-pointed *8. halophilum*

+ Glaucous-green, sparsely calcareous-punctate shrub; calyx lobes triangular-obtuse *9. acerosum*

27. Scales on the scape overlapping; outer bract longer than the inner bracts *13. confertiflorum*

+ Scales on the scape (if scape present) remote; bract subequal or outer bract shorter than the inner bracts 28

28. Bracts pubescent 29

+ Bracts glabrous 36

29. Scapes lacking 30

+ Scapes always 2-4 × longer than the leaves 32

30. Leaves up to 10 mm long; calyx up to 11 mm long *26. androsaceum*

+ Leaves more than 15 mm long; calyx more than 13 mm long 31

31. Bracts subequal; outer bract narrowly triangular-lanceolate *22. hypochaerum*

+ Outer bract shorter than the inner bracts, triangular *24. puberulum*

32. Strongly glaucous shrub; spikes short with 2-4 spikelets; scapes 5-6-scaled *20. strigillosum*

+ Glaucous-green to greenish shrubs; spikes with more than 6 spikelets; scapes 1-4-scaled 33

33. Laxly-pulvinate shrubs; spikes branched; inner bracts obtuse 34

+ Compactly pulvinate shrubs; spikes unbranched; inner bracts acute to narrowly obtuse 35

34. Bracts subequal; outer bract oblong-triangular *16. glumaceum*

+ Outer bract distinctly shorter than the inner bracts, ovate-triangular *18. huettii*

35. Leaves glabrous, lower leaves spreading; inner bracts oblong-lanceolate, broadly scarious-margined *24. puberulum*

+ Leaves pubescent, lower leaves strongly reflexed; inner bracts elliptic-lanceolate, scarious except for the nerves *23. reflexifolium*

36. Leaves 1.8-2.5 mm broad; scales on the scapes usually lacking; inner bracts retuse-mucronulate *14. dianthifolium*

+ Leaves up to 1.4 mm broad; scapes if present 1-5-scaled; inner bracts acute or obtuse, rarely retuse-mucronate 37

37. Scapes 1-spiked 38

+ Scapes 2-spiked 41

38. Lower leaves strongly reflexed; inner bracts elliptic-lanceolate
23. *reflexifolium*

+ Lower leaves not strongly reflexed; inner bracts oblong-spathulate to oblong-lanceolate 39

39. Scapes 2-3 × longer than the leaves, 2-3-scaled; bracts purple-tinged 17. *caesareum*

+ Scapes rarely exceeding the leaves, 1-scaled; bracts not purple-tinged 40

40. Strongly glaucous shrub; leaves densely calcareous-punctate; inner bracts oblong-spathulate to narrowly lanceolate, aristulate 25. *damassanum*

+ Greenish to glaucous-green shrub; inner bracts oblong-lanceolate, mucronate 26. *androsaceum*

41. Lower parts of branches with persistent circinate leaf bases
21. *calvertii*

+ Lower parts of the branches without persistent circinate leaf bases 42

42. Plants densely tufted, calcareous punctate; inner bracts scarious except for the green nerves 19. *saxifragiforme*

+ Plants not as above; inner bracts broadly scarious-margined 43

43. Branches long, naked in the lower parts; lower leaves strongly reflexed 16. *glumaceum*

+ Branches short, leafy all along; lower leaves not reflexed 17. *caesareum*

1. A. latifolium Boiss. & Noë, in Boiss., Diagn. sér. 2, 4: 61 (1859).

Type: [Iran] in Persia Mesopotamiae finitima, Noë, (G).

South-East Anatolia.

2. A. curviflorum Bunge in Mém. Acad. Sc. Petersb. sér. 7, 18, 2: 57 (1872).

Habitat: dry gravelly hills.

Type: [W Iran] in rupestris Persia mediae occident. prope Kohrud et prope Schur-ab, inter Isfahan et Kum, Bunge & Bienert (LE).

Turkey A9 Kars: below Kağızman, 1300 m, Davis 46843.

East Anatolia, a new record for Turkey.

3. A. quinquelobum Bunge in Mém. Acad. Sc. Petersb. sér. 7, 18, 2: 56 (1872).

Type: [NE Iran] in rupibus dolomiticus aridis prope Schahrud provinciae Chorassan occidentalis, Bunge & Bienert (LE).

Turkey A9 Kars: 10 km from Kağızman on the Kars—Iğdır road, Jardine 555A.

East Anatolia, a new record for Turkey.

4. A. erinaceum (Jaub. & Sp.) Lincz. in Fl. URSS 18: 310 (1952).

Syn.: *Statice erinacea* Jaub. & Sp. in Ann. Sci. Nat. sér. 2, 20: 255 (1843).

S. pungens Jaub. & Sp. l.c.

S. jauberti Girard in Ann. Sci. Nat. sér. 3, 20: 331 (1844).

Acantholimon roseum Boiss., Diagn. sér. 1, 7: 71 (1846).

A. purpureum Parsa in Kew Bull. 1: 210 (1948).

Habitat: granite rocks.

Described from Iran, *Aucher* (P).

East Anatolia.

5. *A. lepturoides* (Jaub. & Sp.) Boiss., Diagn. sér. 1, 7: 17 (1846).

Syn.: *Statice lepturoides* Jaub. & Sp. in Ann. Sci. Nat. sér. 2, 20: 254 (1843).

Type: [Caucasia] crescit in Iberia caucasia, *Ravergie* (P?).

East Anatolia.

6. *A. spirizianum* Mobayen, Revis. Acanthol. 304 (1964).

Habitat: rocky limestone and serpentine slopes, mountain steppe, 1180–2700 m.

1. Leaves pubescent; spikelets 3–5	var. <i>spirizianum</i>	
+	Leaves glabrous; spikelets 6–11	var. <i>multiflorum</i>

var. *spirizianum*

Type: Turkey B9 Van: Başkale, Ispiris Da., rocky serpentine slopes, 2700 m, *Davis & O. Polunin*, D. 23678 (holo. K, iso. E).

South-East Anatolia.

var. *multiflorum* Bokhari, var. nov.

A typo foliis glabris, spiculae 6–11 differt.

Turkey B7 Erzincan: Mutu-Tercan, 4 km E of Hoşap, 1800 m, *Huber-Morath* 11546. B9 Van: 34 km from Gürpinar (Havasor) to Hoşap, dry stony hills, 2150 m, *Davis* 45970 (holo. E; iso K).

South-East Anatolia.

This species is endemic to SE Anatolia.

7. *A. venustum* Boiss., Diagn. sér. 1, 7: 80 (1846).

Syn.: *Statice dianthifolia* Jaub. & Sp. in Ann. Sci. Nat. sér. 2, 20: 253 (1843).

Habitat: volcanic rocks, rocky igneous slopes, limestone hills, mountain steppe, pine and mixed woodland, 650–2350 m.

1. All bracts pubescent	var. <i>assyriacum</i>
+	Bracts glabrous rarely inner bracts sparsely puberulent on the nerve
2.	Spikelets congested; outer bract broadly triangular var. <i>venustum</i>
+	Spikelets fairly remote; outer bract narrowly lanceolate var. <i>laxiflorum</i>

var. *venustum*

Type: [Turkey B5] in Tauro Ciliciae, *Kotschy* 414 (G).

South, Central and East Anatolia.

var. *laxiflorum* (Boiss. ex Bunge) Bokhari, comb. et stat. nov.

Syn.: *A. laxiflorum* Boiss. ex Bunge in Mém. Acad. Sc. Petersb. sér. 7, 18, 2: (1872).

Type: [Turkey C2 Antalya] Elmalu in arvis incultis petrosis, vi 1860, *Bourgeau* 295 (holo. G; iso. K).

South & East Anatolia.

var. **assyriacum** (Boiss.) Boiss., Fl. Or. 4: 832 (1879).

Syn.: *A. assyriacum* Boiss., Diagn. sér. 1, 7: 81 (1846).

Type: [Turkey C8] Assyria inter Diarbekir et Mardin, *Kotschy* (G).

East Anatolia.

8. A. halophilum Bokhari in Notes R.B.G. Edinb. 30: 297 (1970).

Habitat: salt steppe, saline clay hillocks, 900–1100 m.

Type: [Turkey B4 Konya] 10 km from Halkenli to Çihanbeyli, 1000 m, salt steppe in sand, *Dudley*, D. 35931 (holo. E; iso. K).

Central Anatolia; endemic.

9. A. acerosum (Willd.) Boiss., Diagn. sér. 1, 7: 80 (1846).

Syn.: *Statice acerosa* Willd. in Ges. Naturf. Freunde Berlin Neue Schr. 3: 420 (1801).

Habitat: rocky igneous slopes, calcareous and sandy soils, steppe, (20)–800–2000 m.

- 1. Leaves less than 18 mm long; inner bracts up to 8 mm long, scarious except for the nerve var. *parvifolium*
- + Leaves more than 20 mm long; inner bracts more than 9 mm long, ± coriaceous, broadly hyaline-margined 2
- 2. Outer bracts herbaceous, usually shorter than the inner bracts; lower leaves usually not strongly reflexed var. *acerosum*
- + Outer bract reddish, bracts subequal; lower leaves very strongly reflexed var. *brachystachyum*

var. **acerosum**

Syn.: *A. assyriacum* var. *micracme* Näb. & Bornm. in Publ. Fac. Sci. Masaryk 3: 420 (1929).

Type: [Turkey] Armenia, *Tournefort* (B).

Widespread in Anatolia, except in the South-East; Islands.

var. **brachystachyum** Boiss., Fl. Or. 4: 838 (1879).

Syn.: *Acantholimon phrygium* Boiss., Diagn. sér. 1, 7: 79 (1846).

A. pinardi Boiss., l.c.

A. listoniae Boiss. in DC., Prodr. 12: 631 (1848).

A. acerosum var. *pinardi* (Boiss.) Mobayed, Revis. Taxon. Acanthol. 179 (1964).

Syntypes: in regione alpinia montium Lydiae; montes Smyrnæ; Tmolus supra Philadelphiane, *Boiss.*

West & Central Anatolia; endemic.

var. **parvifolium** Bokhari in Notes. R.B.G. Edinb. 30: 300 (1970).

Type: [Turkey B6 Maras] above Göksün, open ground at top of pass, 1067 m, *J. Darrah* 711 (holo. E).

South-East Anatolia; endemic.

10. A. caryophyllaceum Boiss., Diagn. sér. 1, 7: 78 (1846) p.p., excl. var. *brachystachyum* Boiss. (ibid.).

Habitat: rocky igneous slopes and limestone steppe, 1600–2750 m.

- 1. Calyx 11-14 mm long; limb 4-5 mm broad; inner bracts puberulent on the nerve subsp. *caryophyllaceum*
- + Calyx up to 9 mm long; limb 3-5 mm broad; inner bracts glabrous subsp. *parviflorum*

subsp. *caryophyllaceum*

Type: [Iraq] in Kurdistaniae monte Gara, *Kotschy* 368 (holo. G; iso. K!). East Anatolia.

subsp. *parvifolium* Bokhari in Notes R.B.G. Edinb. 30: 299 (1970).

Type: [Turkey A5 Sinop] Boyabat, 350 m, bare eroded hills, clay, *Davis, Coode & Yaltirk*, *D.* 38043 (holo. E).

This subspecies is only known from the type.

11. *A. armenum* Boiss. & Huet in Boiss., Diagn. sér. 2, 4: 64 (1859).

Habitat: stony slopes, 900-2750 m.

- 1. Leaves 2-3 mm broad; outer bract usually larger than the inner bracts var. *armenum*
- + Leaves up to 1.5 mm broad; outer bract usually equal to, rarely shorter or longer than, the inner bracts var. *balansae*

var. *armenum*

Syn.: *A. baltanense* Boiss. & Haussk. in Boiss., Fl. Or. 4: 838 (1879).

Type: [Turkey B8 Erzurum] in Armenia prope Erzeroum, *Huet du Pavillon*, (holo. G; iso. K).

South East Anatolia.

var. *balansae* Boiss. & Huet. in Boiss., Diagn. ser. 2, 4: 64 (1859).

Syn.: *A. balansae* (Boiss. & Huet) Bunge in Mém. Acad. Sc. Petersb. sér. 7, 18, 2: 36 (1872).

A. haussknechtii Bunge in Mém. Acad. Sc. Petersb. sér. 7, 18, 2: 37 (1872).

A. acerosum var. *balansae* (Boiss. & Huet) Mobayen, Revis. Taxon. Acanthol. 179 (1964).

Type: [Turkey B5 Kayseri] in Jugo Aslan dach antitauri, 12 leucis ad orientem, Caesareae in Cappadocia, *Balansa* 1856 (G).

West and adjacent South Anatolia.

12. *A. kotschyi* (Jaub. & Sp.) Boiss., Diagn. sér. 1, 7: 74 (1846).

Habitat: sandy banks or slopes and on calcareous soils, 1020-1700 m.

- 1. Rachis strongly flexuous; spikelets 8-10 mm long; inner bracts lanceolate, cuspidate subsp. *kotschyi*
- + Rachis ± straight; spikelets 10-14 mm long; inner bracts oblong-lanceolate, mucronate to briefly cuspidate subsp. *laxispicatum*

subsp. **kotschyi**

Syn.: *Statice kotschyi* Jaub. & Sp. in Ann. Sci. Nat. sér. 2, 20: 252 (1843).
Acantholimon kotschyi var. *iconicum* Boiss. in DC., Prodr. 12: 628 (1848).

A. iconicum Boiss. & Heldr. in Boiss., Fl. Or. 4: 839 (1879).

Type: [Turkey C5] in Tauro Ciliceae, *Kotschy* 416 (holo. P; iso. K).
 Central & South Anatolia.

subsp. **laxispicatum** Bokhari in Notes R.B.G. Edinb. 30: 299 (1970).

Type: [Turkey A7/B7 Gümüşane] Erzincan-Kelkit, 1700 m, dry slopes, *Davis & Hedge*, D. 31924 (holo. E; iso. K).

Central & East Anatolia.

This species is endemic to Turkey.

13. **A. confertiflorum** Bokhari in Notes R.B.G. Edinb. 30: 295 (1970).

Habitat: chalky hills, 1100–1219 m.

Type: [Turkey C4 Konya] Bozkır, on calc. soil, 1100 m, *Davis* 16600 (holo. E).

Central Anatolia; endemic.

14. **A. dianthifolium** Bokhari in Notes R.B.G. Edinb. 30: 296 (1970).

Habitat: rocky slopes, 2800–2956 m.

Type: [Turkey C10 Hakkari] Sat Dağ, above Yüksekova, near permanent snow beds, patches of earth in the rocks, 2900 m, *Duncan & Tait* 91 (holo. E).

South-East Anatolia; endemic.

15. **A. libanoticum** Boiss. in DC., Prodr. 12: 630 (1848).

Syn.: *A. caryophyllaceum* var. *brachystachyum* Boiss., Diagn. sér. 1, 7: 79 (1846).

Habitat: mountain slopes, 1700–1800 m.

Type: [Lebanon] in regione media libani ad Cedros et in declivitate orientali circa Ainete, *Aucher* 2507 (K).

16. **A. glumaceum** (Jaub. & Sp.) Boiss., Diagn. sér. 1, 7: 75 (1846).

Syn.: *Statice glumacea* Jaub. & Sp. in Ann. Sci. Nat. sér. 2, 20: 251 (1843).

Habitat: clay slopes and chalky hills, 1520–1950 m.

Type: [Turkey] Armenia, *Tournefort*.

East & Central Anatolia.

17. **A. caesareum** Boiss. & Bal. in Boiss., Diagn. sér. 2, 4: 66 (1859).

Habitat: non-lime scree, igneous slopes, 1280–2286 m.

Type: [Turkey B6] in regione subalpina montis Ali Dagh prope Caesaream, 1280 m, *Balansa* 949 (G).

Central Anatolia; endemic.

18. *A. huetii* Boiss., Fl. Or. 4: 835 (1879).

Habitat: rocky calcareous slopes, 1900–2200 m.

Type: [Turkey A8 Erzurum] in Armenia supra Maimansour, viii 1853, *Huet* (G).

Central & South Anatolia; endemic.

19. *A. saxifragiforme* Mobayen, Revis. Taxon. Acanthol. 307 (1964).Type: [Turkey B7 Diyarbakir] 5 km N of Ergani, calcareous hillsides, 1000 m, *Davis & Hedge*, D. 29022 (holo. BM; iso. E).

Endemic; only known from the type.

20. *A. strigillosum* Bokhari in Notes R.B.G. Edinb. 30: 299 (1970).Type: [Turkey B6 Malatya] 2 miles N of Hekimhan, very eroded hillside, 1100 m, *Davis & O. Polunin*, D. 24828 (holo. E; iso. K).

Endemic; only known from the type.

21. *A. calvertii* Boiss., Diagn. sér. 2, 4: 65 (1859).Syn.: *A. glumaceum* var. *glabra* Mobayen, Revis. Taxon. Acanthol. 313 (1964).*A. calvertii* var. *sanguineum* Mobayen, l.c. 312 (1964).

Habitat: igneous rocks and rocky slopes, 1210–3535 m.

Type: [Turkey B8 Erzurum] Armeniae monte Techdagh (Palendökan Da.), *H. H. Calvert* 507 (G).

East Anatolia; endemic.

22. *A. hypochoerum* Mobayen, Revis. Taxon. Acanthol. 303 (1964).

Habitat: rocky igneous hillside, limestone.

Type: [Turkey B7 Erzincan] Erzincan-Refahiye, 1400 m, *Davis & Hedge*, D. 32683 (holo. K; iso. E).

This species is endemic to Turkey.

23. *A. reflexifolium* Bokhari in Notes R.B.G. Edinb. 30: 297 (1970).

Habitat: volcanic rocks and stony slopes, 1700–3000 m.

Type: [Turkey B9 Van] Van-Başkale, Halanduran Da., 20 km from Başkale, 3000 m, *McNeill* 657 (holo. E; iso. K).

East & adjacent Central Anatolia; endemic.

24. *A. puberulum* Boiss. & Bal. in Boiss., Diagn. sér. 2, 4: 62 (1859).Habitat: calcareous rocks, arid steppe, *Pinus* wood, 829–2200 m.

1. Leaves densely pubescent; outer bract shorter than the inner bract var. *puberulum*
- Leaves glabrous; bracts \pm subequal 2
2. Scapes longer than the leaves; inner bracts rather narrowly scarious-margined var. *longiscapum*
- + Scapes lacking; inner bracts scarious except for the nerves var. *glabrum*

var. **puberulum**

Syn.: *A. cataonicum* Bunge in *Mém. Acad. Sc. Petersb. sér. 7, 18, 2: 43* (1872).

A. peronini Boiss., *Fl. Or. 4: 842* (1879).

Type: [Turkey B5 Kayseri] in regione alpina montis Aslandach, Cappadociae ad orientem montis Argaei, *Balansa* (G). Central & South Anatolia.

var. **longiscapum** Bokhari in *Notes R.B.G. Edinb. 30: 300* (1970).

Type: [Turkey C4 Konya] S Karance Dere between Geyik Da. and Bozkir, 829 m, *Davis 14630* (holo. E; iso. K).

var. **glabrum** Bokhari in *Notes R.B.G. Edinb. 30: 300* (1970).

Type: [Turkey C2 Antalya] distr. Elmali, Camçukuru yayla, Bey Da., 1750 m, *Khan, Prance & Ratcliffe 315* (holo. E; iso. K).

This species is endemic to Turkey.

25. ***A. damassanum*** Mobayen, *Revis. Taxon. Acanthol. 306* (1964).

Habitat: calcareous steppe, dry slopes, 850–1390 m.

- 1. Inner bracts oblong-spathulate; calyx limb truncate var. *damassanum*
- + Inner bracts lanceolate; calyx limb ± 5-lobed var. *lancibracteatum*

var. ***damassanum***

Type: [Syria: Anti-Lebanon] Nebek, dry slopes, 1676 m, *Davis 6451 A* (holo. K; iso. E).

Upper Euphrates.

var. ***lancibracteatum*** Bokhari in *Notes R.B.G. Edinb. 30: 300* (1970).

Type: [Turkey B7 Erzincan] foot of Kesiş dağ above Cimin, dry metamorphic hills, 1700 m, *Davis & Hedge, D. 31676* (holo. E; iso. BM).

East Anatolia.

This variety is endemic to Turkey.

26. ***A. androsaceum*** (Jaub. & Sp.) Boiss., *Diagn. sér. 1, 7: 73* (1846).

Habitat: stony limestone, exposed mountain tops, scree, 1200–3000 m.

- 1. Leaves usually glaucous; scapes 1-spiked, bracts green or greenish; outer bract oblong-lanceolate; inner bracts acuminate longly cuspidate subsp. *androsaceum*
- + Leaves green to glaucous-green, scape usually 2-spiked; outer bract ovate-triangular; inner bract obtuse shortly cuspidate subsp. *lycaonicum*

subsp. ***androsaceum***

- 1. Calyx pink to dark purple var. *purpurascens*
- + Calyx white 2
- 2. Leaves 8–20 mm long, laxly tufted, bracts or leaves glabrous var. *androsaceum*
- + Leaves 5–8 mm long, densely tufted; leaves and bracts strongly pubescent var. *creticum*

var. **androsaceum**Syn.: *Statice androsacea* Jaub. & Sp. in Ann. Sci. Nat. sér. 2, 20: 250 (1843).*S. pauciflora* Jaub. & Sp., l.c.*S. tournefortii* Jaub. & Sp., l.c.*Acantholimon tournefortii* Boiss. in DC., Prodr. 12: 627 (1848).*A. echinus* auct. Boiss., Fl. Or. 4: 840 (1879), quoad description. excl. basionym non (L.) Boiss.Syntypes: Crete, *Tournefort*; in Olympo Bithynico, *Aucher-Eloy* 2508 (P). Mainly South & West Anatolia; rare in Central Anatolia.var. **creticum** Boiss., Diagn. sér. 1, 7: 73 (1846).Syn.: *A. creticum* (Boiss.) Rech. f. in Öst. Bot. Zeitschr. 84: 180 (1935). Described from Crete, *Sibthorp*; *Sieber* (G).

South Anatolia.

var. **purpurascens** Bokhari in Notes R.B.G. Edinb. 30: 300 (1970).Type: [Turkey C3 Isparta] Sücüler (Isauria), Dedegöl Da. above Dedegöl tarn, 2500 m, *Davis* 16012 (holo. E; iso. K).

West & South West Anatolia; endemic.

subsp. **lycaonicum** (Boiss. & Heldr.) Bokhari in Notes R.B.G. Edinb. 30: 299 (1970).Syn.: *A. lycaonicum* Boiss. & Heldr. in DC., Prodr. 12: 627 (1848).*A. wiedemannii* Bunge in Mém. Acad. Sc. Petersb. sér. 7, 18, 2: 45 (1872).Type: [Turkey C4 Konya] inter Beyshehr et Koniah Lycaoniae, *Heldreich*. South and Inner Anatolia, and adjacent North Anatolia; endemic.27. **A. bracteatum** (Girard) Boiss., Diagn. sér. 1, 7: 70 (1846).

Habitat: rocky slopes, sandy soil, mountain steppe, 1700–3100 m.

i. Calyx purple; nerves not excurrent var. *bracteatum*
+ Calyx white; nerves ± excurrent var. *capitatum*var. **bracteatum**Syn.: *Statice bracteata* Girard in Ann. Sci. Nat. sér. 3, 2: 330 (1844).*Acantholimon splendidum* Bunge in Mém. Ac. Sc. Petersb. sér. 7, 18, 2: 17 (1872).Type: [Persia] in Azerbaidjan prope Seid Khadje, *Aucher-Eloy* 5242 (holo. P; iso. K).

South-East Anatolia.

var. **capitatum** (Sosn.) Bokhari in Notes R.B.G. Edinb. 30: 300 (1970).Syn.: *A. capitatum* Sosn. in Monit. Jard. Bot. Tiflis 11: 11 (1915).*A. scabiosum* Mobayen, Revis. Taxon. Acanthol. 298 (1964).Type: [Turkey A8 Erzurum] 'Kars': d. Olty, inter pp. Karnawaz et Lespek, vii 1911, *Sosnowski* (TBI).

East Anatolia: endemic.

6. **ARMERIA** Willd., *Enum. Pl. Berol.* 333 (1809) *nom. conserv.*Syn.: *Statice* L., *Sp. Pl.* 274 (1753) *partim.**Statice* Sect. *Armeria* DC., *Flore Francaise* 3: 419 (1805).

Perennial herbs with branched woody caudex. Leaves radical, numerous, 1-nerved. Inflorescence a spicate-head of aggregate, bracteate cymose spikelets at the end of the scape, subtended by scarious involucre; top of the scape enclosed by a tubular sheath formed by a downward prolongation of the connate bases of the outer involucral bracts. Spikelets 2-4-flowered; flowers stalked. Calyx funnel-shaped, 5-nerved, tube herbaceous, limb scarious, 5-lobed, pleated, lobes broadly triangular with excurrent nerves. Petals free except at the extreme base. Stamens distinct inserted at the base of the petals. Styles free to near the base, hairy in the lower third. Stigma cylindrical, filiform.

About 60 species of maritime, arctic and alpine habitats in temperate Europe, Asia, N Africa, N America and Chile. There are only 2 species in Turkey.

KEY TO SPECIES OF ARMERIA IN TURKEY

- 1. Leaves 40-120 mm long, not fleshy; scapes glabrous throughout *I. cariensis*
- + Leaves 4-5 mm long, fleshy; scapes pilose in the lower part *2. trojana*

1. ***A. cariensis*** Boiss. in DC., *Prodr.* 12: 677 (1848).

Habitat: mountain slopes.

Syntypes: [Turkey] Caria, *Aucher* 2495 (BM); in herbidis montis Cadmi, *Boissier*.

Turkey in Europe, West & Central Anatolia.

2. ***A. trojana*** Bokhari & Quézel in *Candollea* 25: 376 (1970).Type: [Turkey Bİ Balikesir] Kaz dağ, schistes, 1600-1700 m, v-vi, *J. Contandriopoulos*, *A. Pamukcuglu*, *P. Quézel* (holo. E.).

Endemic. Allied to *A. splendens* (Lag. & Rodr.) Webb from Spain but differing in its ciliolate leaf margin, scape pilose at the base, and brownish (instead of dark purple) inner bracts. Less closely related to *A. alpina* (DC.) Willd. from the mountains of central and southern Europe, and differing in its densely caespitose habit, small fleshy ciliolate-margined leaves, and scape pilose at the base.